

# Face Recognition based Mobile Automatic Classroom Attendance Management System

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**Abstract** - Classroom attendance check is a contributing factor to student participation and the final success in the courses. Taking attendance by calling out names or passing around an attendance sheet are both time-consuming, and especially the latter is open to easy fraud. As an alternative, RFID, wireless, fingerprint, and iris and face recognition-based methods have been tested and developed for this purpose. Although these methods have some pros, high system installation costs are the main disadvantage.

The present paper aims to propose a face recognition-based mobile automatic classroom attendance management system needing no extra equipment. To this end, a filtering system based on Euclidean distances calculated by three face recognition techniques, namely Eigenfaces, Fisherfaces and Local Binary Pattern, has been developed for face recognition. The proposed system includes three different mobile applications for teachers, students, and parents to be installed on their smart phones to manage and perform the real-time attendance-taking process. The proposed system was tested among students at Ankara University, and the results obtained were very satisfactory.

**Key Words:** Face detection, face recognition, eigenfaces, fisherfaces, local binary pattern, attendance management system, mobile application, accuracy.

## 1. INTRODUCTION

Classroom attendance check is a contributing factor to student participation and the final success in the courses. Taking attendance by calling out names or passing around an attendance sheet are both time-consuming, and to easy fraud with. As an alternative, RFID, wireless, fingerprint, and iris and face recognition-based methods have been tested and developed for this purpose. Although these methods have some pros, high system installation costs are the main disadvantage. The present paper aims to propose a face recognition-based mobile automatic classroom attendance management system needing no extra equipment. To this end, a filtering system based on Euclidean distances calculated by three face recognition techniques, namely Eigen-faces, Fisher-faces and Local Binary Pattern, has been developed for face recognition. The proposed system includes two different mobile applications for teachers and students to be installed on their smart phones to manage and perform the real-time attendance-taking process.

## 2. SCOPE AND MOTIVATION

Most educational institutions are concerned with students' participation in courses since student participation in the classroom leads to effective learning and increases success rates [1]. Also, a high participation rate in the classroom is a motivating factor for teachers and contributes to a suitable environment for more willing and informative teaching. The most common practice known to increase attendance in a course is taking attendance regularly.

There are two common ways to create attendance data. Some teachers prefer to call names and put marks for absence or presence. Other teachers prefer to pass around a paper signing sheet. After gathering the attendance data via either of these two methods, teachers manually enter the data into the existing system. However, those non-technological methods are not efficient ways since they are time consuming and prone to mistakes/fraud. The present paper aims to propose an attendance-taking process via the existing technological infrastructure with some improvements.

A face recognition-based mobile automatic classroom attendance management system has been proposed with a face recognition infrastructure allowing the use of smart mobile devices. In this scope, a filtering system based on Euclidean distances calculated by three face recognition techniques, namely Eigenfaces, Fisherfaces, and Local Binary Pattern (LBP), has been developed for face recognition. The proposed system includes three different applications for teachers, students, and parents to be installed on their smart phones to manage and perform a real-time polling process, data tracking, and reporting. The data is stored in a cloud server and accessible from everywhere at any time. Web services are a popular way of communication for online systems, and RESTful is an optimal example of web services for mobile online systems.

## 3. LITERATURE REVIEW

This paper presents new evidence on the effects of attendance on academic performance. We exploit a large panel data set for Introductory Microeconomics students to explicitly take into account the effect of unobservable factors correlated with attendance, such as ability, effort and motivation. We find that neither proxy variables nor

instrumental variables provide a viable solution to the omitted variable bias. Panel estimators indicate that attendance has a positive and significant impact on performance. Lecture and classes have a similar effect on performance individually, although their impact cannot be identified separately. Overall, the results indicate that, after controlling for unobservable student characteristics, teaching has an important independent effect on learning.

This paper describes a face detection framework that is capable of processing images extremely rapidly while achieving high detection rates. There are three key contributions. The first is the introduction of a new image representation called the Integral Image which allows the features used by our detector to be computed very quickly. The second is a simple and efficient classifier which is built using the AdaBoost learning algorithm (Freund and Schapire, 1995) to select a small number of critical visual features from a very large set of potential features. The third contribution is a method for combining classifiers in a cascade which allows background regions of the image to be quickly discarded while spending more computation on promising face-like regions. A set of experiments in the domain of face detection is presented. The system yields face detection performance comparable to the best previous systems (Sung and Poggio, 1998; Rowley et al., 1998; Schneiderman and Kanade, 2000; Roth et al., 2000). Implemented on a conventional desktop, Face detection proceeds at 15 frames per second.

**B. Proposed System:**

- **Architecture of the Proposed System**

The proposed system's architecture based on mobility and flexibility is shown in Fig.1.

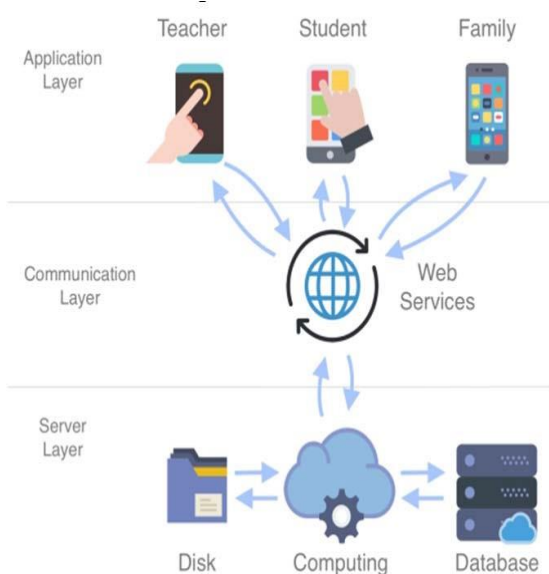


Figure 1. System Architecture

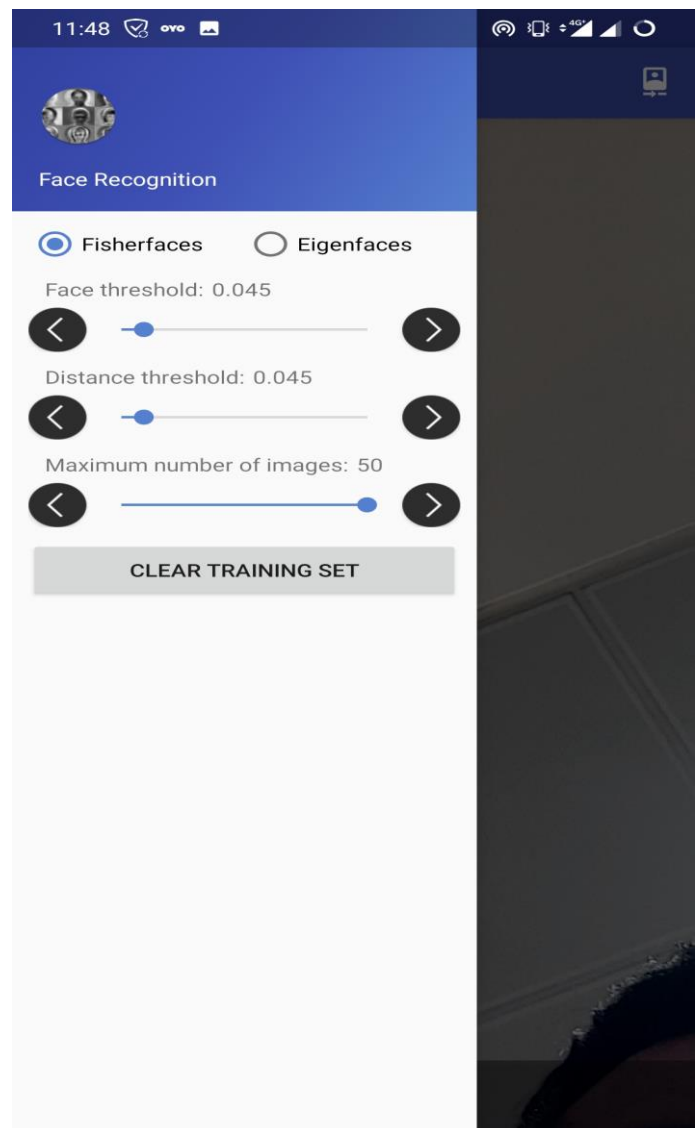


Figure 2. Interface on mobile device.

**3. CONCLUSIONS**

Current way of taking attendance is time consuming and easy to fraud with.

Sheets don't always make it to each and every student.

Recording keeping sometimes is unmanageable.

This system will tackle these issues and make attendance hassle free and convenient.

Also it will make easier to edit, update and sharable.

This paper would serve as an encouragement to others to further explore the sector of attendance management system.

Maybe in further ages there'll be no sheets whatsoever, only camera and devices automated to take your attendance.

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